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ABSTRACT

A teacher self-report instrument, the Learning Climate Inventory (LCI), was used to gather teacher perceptions about their administrators, peers, and teaching job. An observational checklist was used on the same large sample. Data were gathered from 700 classrooms and 867 teachers in 30 schools in Tulsa and Oklahoma City, Oklahoma, and Fort Worth, Texas. The researcher's goal was to find the relationship between the spatial characteristics of public school classrooms and alternative modes of teaching and the staff's perceptions of the learning climate. The findings reveal that alternative teaching modes do increase in more open-spaced classrooms. Also, teachers tend to view open-space, high-achieving, smaller schools with ongoing human relations programs for staff as more open. (Author/MLF)

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LEARNING ENVIRONMENTS: SPACE AND PERCEPTIONS

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A learning environment can be described as a place where two or more people gather in the name of education. The setting could be on a log with Mark Hopkins or in an open-designed, carpeted, climate-controlled school with a team of Hopkinses. Although much of the content of this paper applies to all levels and types of educational institutions, the focus is on elementary and secondary learning environments. Obviously, no two environments are exactly alike. Schools have organizational personalities, which include unique organizational styles and human dynamics.

Most recent writings on the subject of learning environments by Anderson and Walberg, (1) and on classroom climates by Nielsen and Kirk, (12) have been grounded in the theoretical models of Murray and Stern, (13) Getzels and Thelen (7) and Getzels (6). These models hold that institutional and individual characteristics interact in schools and determine student learning. In spite of the tremendous amount of energy expended by researchers of learning environments, no clear-cut relationship exists between the environment and student achievement. Bloom (2) recognized the growing complexity of environment as critical for measuring learning outcomes.

One of the reasons for researchers' inability to develop clean relationships between the environment and learner outcomes is that the term environment is too global a concept. The complexity of the

environment may be such that even valid measures are extremely difficult to relate to student outcomes. However, researchers committed to improving school environments realize that the benefit of analyzing those environments comes when we can successfully predict student cognitive and affective outcomes. Combs stresses the need for affective as well as cognitive outcomes by stating: "Our society can get along with a bad reader. A bigot is a danger to everyone." (3:19).

There is strong support among educators that the teacher and classroom climate have reciprocal relationships with school-related attitudes. The relationships are somewhat more complex in a team-taught or cooperative teaching environment. Teachers' perceptions of the learning environment influence how they teach and therefore affect student outcomes. In spite of those assumptions no major study exists that correlates teacher perceptions with student achievement or development.

INSTRUMENTATION

Most efforts to analyze learning environments have included either observational or self-report instruments. Observational instruments are "low inference" because they are utilized to record the directly observable specific behaviors or incidents. Self-report instruments are labeled "high inference" because they ask the respondent to judge how he feels or what he perceives the situation to be. Both types of instruments lack the sophistication to accurately predict the relationship between the school environment and student outcomes.

However, at this writing no other tools exist which hold more promise for organizational researchers.

After analyzing available observational instruments, this writer and his assistant developed and tested the School Organization Checklist (11). This instrument is based on the work by Walberg and Thomas (14) to identify the characteristics of open education. The other instrument is the Learning Climate Inventory (LCI).

THE LEARNING CLIMATE INVENTORY (LCI)

One of the most helpful teacher self-report instruments is the Learning Climate Inventory (LCI) (9). The LCI was developed to access the learning climate in elementary and secondary schools. It was initially used as an organizational development tool in several Ohio school districts to gather staff perceptions of the learning climate in each building and in the entire district. Profiles for each school based on the data gathered were constructed and given to the staff in interpretive conferences. The instrument contains twenty items with a seven-point Likert type scale. Except for two reverse items, a response of seven indicates an open learning environment. The original instrument contained forty-five items. Pilot tests and factor analytic procedures reduced the items to twenty (20) with five factors. Based on six samples of teachers ranging from 134-1000, the reliability coefficients for each factor range from .50 to .75. Test-retest reliabilities range from .75 to .92. The five factors and their loadings are as follows:

1. Leadership: The extent to which the teachers perceive the leadership behaviors of the administrators. (.45 to .73, 6 items).

2. Freedom: The extent to which teachers feel free to experiment and determine their own instructional activities in their classrooms. (.56 to .64, 5 items).
3. Evaluation: The extent to which teachers and students are involved in teacher and administrator evaluation. (.47 to .81, 3 items).
4. Compliance: The extent to which teachers feel the pressure to conform to the rules of the system. (.47 to .72, 3 items).
5. Cooperation: The extent to which teachers are supported in their efforts to team-teach and use resource people. (.50 to .66, 3 items).

The LCI is designed to gather teacher perceptions about their administrators, peers, and teaching job. An advantage of the LCI is its brevity. When compared to the sixty-four item OCDQ and the three hundred item OCI, the twenty items on the LCI take only ten to fifteen minutes to complete with care. Experience with longer instruments has been that respondents tend to hurry and are less considerate in their responses, especially if the instruments are administered at the end of the day during a "teachers meeting."

The LCI has been used in recent studies by Hoyle (8, 10) to compare the learning climate in open-space high schools with the learning climate in traditional high schools, and to compare the learning climate in open-space elementary schools with the learning climate in traditional elementary schools. An item by item analysis of the LCI in the high school study revealed that the respondents in the open schools reported significantly greater openness in the scores on items pertaining to teachers' freedom to use varied teaching materials and resource people;

mutual goal setting for teacher evaluation; and job satisfaction. The teachers in traditional schools reported that they were invited to evaluate their principals significantly more often. Comparing the two classes of schools by the five factors revealed that teachers in open schools felt significantly greater pressure to comply or to follow the rules.

The findings were mixed in the elementary school study. There were significant differences between the perceptions of teachers in the open-space school and teachers in the traditional schools. Teachers in the traditional schools viewed the leadership behaviors of their administrators as more open than did the teachers in the open-space schools. However, teachers in the open-space schools viewed their relationship with colleagues as more open than did the teachers in the traditional schools.

These findings relate in part to the findings of Coughlan who wrote,

> In the relatively closed (traditional schools)...staff members are concerned about aspects of the work relationship more directly under the influence and control of the hierarchial superordinate...In relatively open schools... the focus of concern in the teacher group was directed toward horizontal relations (colleague relations). (4:56)

The LCI has been used to gather data for several dissertations. It has also been used in studies conducted in Switzerland, Australia, New Zealand, England and Canada.

The reliability of most brief instruments is suspect by other organizational theorists. Traditionally, more items in each dimension adds internal strength to the instrument. However, some theorists argue that three items per dimension are as reliable as ten if the

three items are properly written and analyzed. That is, a rose is a rose is a rose. The LCI needs more testing to strengthen its predictive validity. Also, several of the items could be rewritten to strengthen its internal consistency. Even with these limitations the LCI offers the researcher or development person a reliable research instrument.

A STUDY OF LEARNING ENVIRONMENTS

Using the previously discussed theory base and strategy, this researcher attempted to tackle an extremely complex learning environment problem. The challenge to attempt the study came from Robert Dreeben in the Second Handbook of Research on Teaching, edited by R. M. W. Travers. Dreeben's chapter on "The School as a Workplace" entertained theoretical notions about social patterns and educational workplaces. He states:

> It is probably not possible to discover how teaching activities and the classroom experiences of children contribute to what children learn in schools unless we can identify how different teaching activities in different settings create opportunities for and constraints upon learning. In plainer language, the study of workplaces can contribute to our knowledge about what is possible and how things work in schools. (5:450, 451)
>
> ...The questions that need to be asked are: given existing structural arrangements in schools and classrooms, what are the forms that teaching activities can take? What are the alternative structural arrangements that can serve educational purposes? And what opportunities and constraints do they create for the character of teacher's work? (5:471)

With the assistance of a faculty research grant from the University of Tulsa Research Advisory Committee and based on the above questions a study was conducted. An attempt was made to find the relationship between the spatial characteristics of public school

classrooms and alternative modes of teaching and the staff's perceptions of the learning climate. The following questions were examined:

1. Do alternative instructional or teaching modes increase as spatial arrangements become more open? (e.g. fewer walls or barriers between classroom or teaching stations).
2. What are the alternative structural arrangements that tend to encourage alternative modes of instruction?
3. Do the teachers' perceptions of the learning climate become more "open" as the teaching or structural areas become more open and flexible?
4. Are teachers' perceptions of the learning climate more open in low achieving or high achieving schools?
5. Are teachers' perceptions of the learning climate more open in small, medium or large schools?
6. Are teachers' perceptions of the learning environment more open if the teachers and administrators are involved in an on-going human relations program?

Data were gathered from 700 classrooms and 867 teachers in 30 schools in Tulsa and Oklahoma City, Oklahoma, and Fort Worth, Texas. The schools were selected according to the following criteria:

1. Degree of open space. The schools ranged from 85% open space design to traditional structures with no flexible or open space.
2. Economic level. The schools were selected to represent the schools in the three cities in terms of housing areas and per pupil expenditure.

Visits were made to each of the thirty schools and 700 classrooms, to observe the instructional program and the organizational strategies, to interview the principal and teachers, and to administer the LCI. Principals and teachers were interviewed by this researcher or his assistant Gerald Wright. Most classrooms were visited and observed. The interviews and observations were recorded on the School Organization Checklist (11). Upon leaving the building the two researchers compared observations and recorded them on one checklist. Each teacher and principal was asked to respond to the LCI. Total time in each building was $1\frac{1}{2}$ - 2 hours. Thus, care was taken to observe and record the

actual instructional program in terms of teaching modes, materials, staffing, class organization and space utilization.

RESULTS

Do alternative instructional or teaching forms increase as spatial arrangements become more open (e.g. fewer walls or barriers between classrooms or teaching stations). To answer this question the researcher and his assistant inspected each instructional area in the building and decided upon the percent of flexible, open-space actually used for instruction. Gymnasiums and auditoriums were not considered open-space because they were used primarily for physical education and assemblies. Instructional modes and staff organization were the next points of inquiry. We observed the percent of large groups, more than 50 students; medium groups, 16-49 students; small groups, 2-15 students; and individual instruction. Percent of cooperative or team-teaching was determined. Freedom of student movement within the classroom or instructional area was observed and recorded.

Analysis of the data revealed that alternative teaching modes do increase as spatial arrangements become more open. There exists a relationship among the four variables of open-space, instructional modes, team teaching, and student movement in the 700 classrooms in the 30 schools.

No school in the study was 100% open-space, but ranged from 0% to 85%. Our results revealed that if a school contained at least 20% open-space, then instructional modes, team teaching and student movement were similar. That is, 20% open-space was enough to encourage

25% to 50% more instructional modes, considerably more cooperative teaching and greater freedom for student movement. Schools with less that 20% open-space had fewer forms of instruction, little or no team teaching and very limited student movement. Traditional buildings with less that 20% open-space encourage traditional instructional programs regardless of the grade level.

The second question was as follows: What are the alternative structural arrangements that tend to encourage alternative modes of instruction?

As described above at least 20% of open flexible space is necessary for more instructional modes, team teaching, and freer student movement. The optimum use of the open-space appeared to be in the skill areas of math, reading, language arts (grammar), and science.

Two teachers and two interns or para-professionals working with 45-60 students in a double sized, carpeted room was the arrangement where the greatest number of instructional and learning activities took place. This arrangement created an environment where teachers shared their talents and moved among the students for small group and individual instruction. Most double room arrangements had adequate sound systems and audio visual equipment for large group instruction.

Carpet is an acoustical requirement when 45-60 students are talking, moving to resource materials, and engaged in independent study. The large areas with carpet were much quieter than large areas with tile floors.

Most learning resource centers or libraries observed in this study remain little changed from the libraries of 1940. Most of the centers

contained the latest audio visual equipment and reading materials. However, rigid scheduling for the students to use the center restricted its value as an instructional center. Rarely did the researchers view students (even in the most open-space buildings) given free access to the learning resource center. Thus, based on the findings in the study, learning resource centers should be available in each double room arrangement and a central learning resource center should be de-emphasized.

Question number three asked if teachers' perceptions of the learning environment became more open as the teaching or structured areas became more open and flexible? The data from the LCI revealed that teachers in schools with at least 20% open, flexible space viewed their learning environment as more open on three of the five factors (e.g. Freedom, Compliance, and Cooperation) (See Table 1a). Teachers in schools with less than 20% open-space viewed their learning climate as more open on the evaluation factor. There was no significant difference between the teachers in open-space schools and teachers in traditional schools on the Leadership factor. These findings support the findings in question number one. That is, schools with at least 20% open space, contain a greater number of instructional modes (25%-50% more), considerably more team or cooperative teaching, greater amount of freedom for students to move about the classroom and a more open learning environment on three of five LCI factors as viewed by teachers.

The statistical procedure was to compute the average factor score for each of the 867 teachers who responded to the LCI. The next step

was to compute mean factor scores for each of the five factors for 459 teachers in traditional schools (less that 20% open space) and 408 teachers in schools with 20% to 85% open space. T-tests were run between the two groups on each factor to test the discrimination of the LCI factors. Mean differences between the teachers in schools with at least 20% open space and teachers in schools with 20% or less open space were significant at the .01 level on four of five factors. The same computational procedure was used to answer research questions four, five and six.

Question number four asked if teachers' perceptions of the learning climate are more open in low achieving or high achieving schools? The data revealed that high achieving schools* viewed their learning climate as more open on three of the five factors (Leadership, Evaluation, and Cooperation). (See Table 1,b).

Question number five asked if teachers' perceptions of the learning climate was more open in small, medium, or large schools. The teachers in small schools (500 or fewer students) viewed their learning climate as more open than the climate in either the medium (510-803 students) or large (975-1900 students) schools on three of the five factors (Leadership, Freedom, and Cooperation). (See Table 1,c). Teachers in medium sized schools viewed the learning climate as more open than the climate in large schools on three of the five factors (Freedom, Compliance, and Cooperation).

The final question asked if teachers' perceptions of the learning climate are more open if the teachers and administrators are involved in an on-going human relation program. On two of the five factors

*Achievement level of each school was determined from data and by interviews in the research division of each school district.

(Freedom and Compliance) (See Table 1,d) teachers who are involved in an on-going human relations program which includes their principal perceived greater professional freedom to experiment and determine their instructional activities. They also felt less pressure to conform to the rules of the systems.

DISCUSSION

The research reported in this paper was in part an attempt to use a recently developed high inference teacher self-report instrument and a low inference observational check list on the same large sample of teachers and administrators. The two instruments tended to measure several variables systematically. Simply, through observation the researchers found that learning environments with 20% to 85% open space contained 25% to 50% more instructional modes, considerably more team teaching, and greater freedom for students to move about the classroom. Concurrent findings came from the teacher self-report LCI. The teachers in learning environments with 20% to 85% open space viewed the learning climate as significantly more open on four of five factors. From these findings an optimum learning environment was recommended.

Spatial characteristics and observational data were not considered in the final research questions. The LCI data were used to test the discrimination of the five factors when the schools were grouped according to achievement, size, and the extent of the use of human relations programs. The findings revealed that the LCI factors do discriminate. The results of the findings indicate that the learning climate is generally more open in the high achieving schools. In most cases the high achieving schools were located in lower income

areas. Teaching in a lower income neighborhood may be less desirable and perceived by the teachers to be a more closed or less open learning environment.

Size of the school and climate are related. The findings indicate that larger schools tend to have a more closed learning climate. Smaller faculties tend to interact more frequently and establish a collegial atmosphere quicker than their colleagues in larger schools. Perception research through the use of self-report instruments becomes more difficult to conduct in larger schools because of increased communication problems and less faculty interaction which can produce more diverse teacher perceptions of the environment.

Finally, on-going human relations programs apparently affect staff perceptions of their learning climate. If teachers in schools with human relations programs perceive greater freedom to teach and less pressure to comply with school rules, then the human relations programs should continue with greater emphasis.

The findings of this study like those in other studies looking at the classroom as a social-organizational unit raises many questions because of the obvious intervening variables. However, the results lend themselves to developing the following research hypotheses.

1. Schools with at least 20% open space will have 25-50% more instructional modes than schools with less than 20% open space.
2. The learning environment in schools with at least 20% open instructional space is perceived as more open by the instructional staff.

Table 1

DIFFERENCE BETWEEN SCHOOLS AS SHOWN BY TEACHERS' RESPONSES ON THE FIVE LCI FACTORS

	n	Leadership	t	Freedom	t	Evaluation	t	Compliance	t	Cooperation	t
a) Open Space											
85%-20%	459	4.990		5.532	2.736**	3.200		4.137		6.045	6.463*
less than 20%	408	5.066	n.s.	5.346		4.029	7.241**	4.560	3.908**	5.485	
b) Achievement											
High	285	5.482	5.055**	5.700		3.309	2.463*	4.069		6.308	5.041*
Low	369	5.074		5.605	n.s.	3.035		4.168	n.s.	5.912	
c) Size											
large	393	5.041		5.499		3.256		4.295		5.869	
small	117	5.510	4.731**	5.865	4.4012**	3.185	n.s.	4.128	n.s.	6.373	5.475*
small	117	5.510	4.885**	5.865	2.303*	3.185		4.128		6.373	3.522*
medium	357	4.996		5.639		3.175	n.s.	3.885	n.s.	6.049	
medium	357	4.996		5.639	2.148*	3.175		3.885		6.049	2.166*
large	393	5.041	n.s.	5.499		3.256	n.s.	4.295	3.590**	5.870	
d) Human Relations											
extensive	487	5.066		5.722	4.378**	3.240		3.790		6.056	
little	380	5.111		5.457		3.189	n.s.	4.501	6.847**	5.953	n.s.

*Significant at the .05 confidence level
**Significant at the .01 confidence level

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